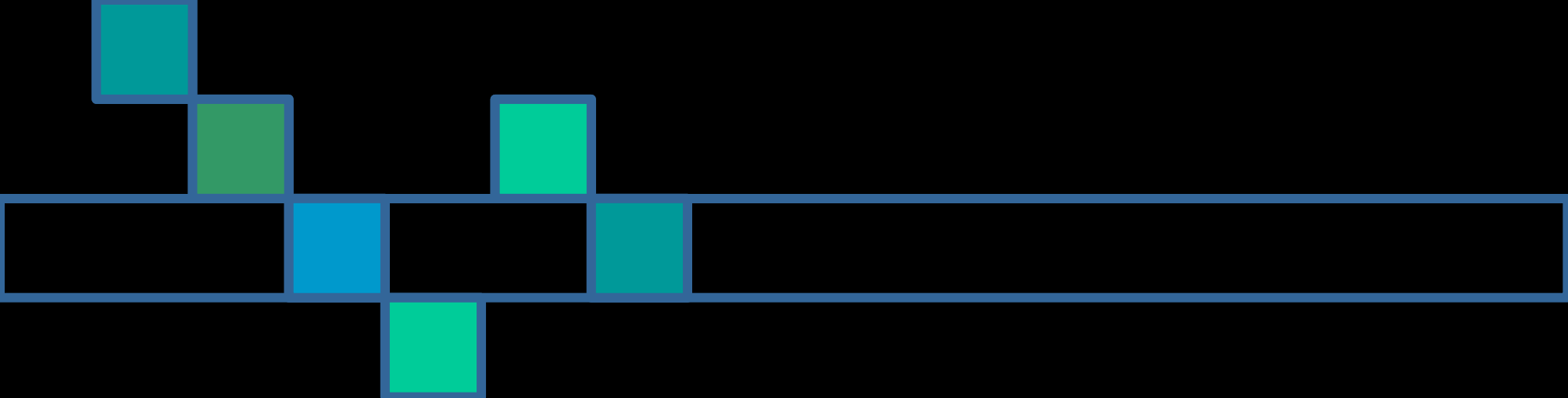




ARISS via Voice/IP



CONTACTING THE INTERNATIONAL SPACE
STATION VIA AMATEUR RADIO USING
VOICE/IP SOFTWARE



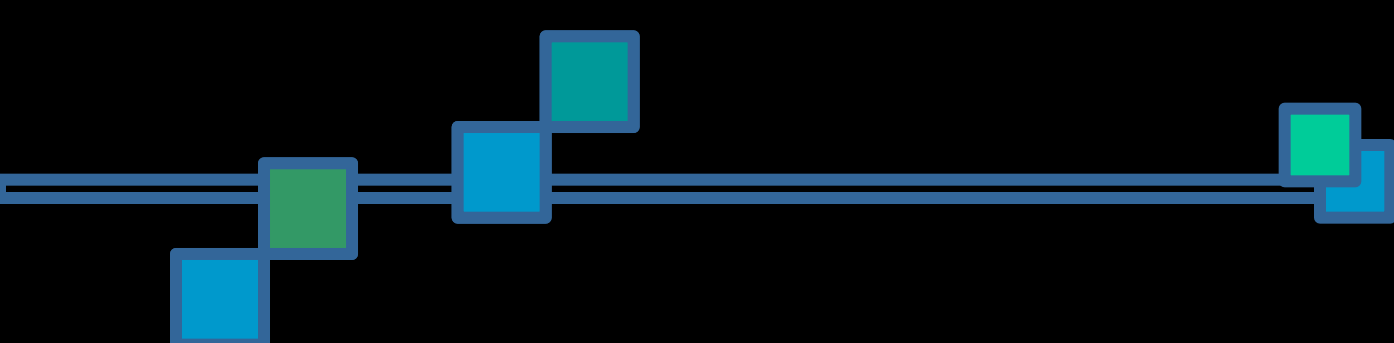
Vision Statement

Voice/IP communications can become the most viable method to contact the ISS, for the 50% of ARISS program schools who do not have access to a local satellite ground tracking station.

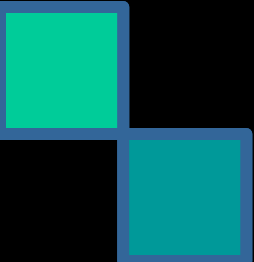


Goals and Objectives

- Allow a school participating in the ARISS program to communicate with the ISS using only Voice/IP software on a notebook PC.
 - Utilize the advantages of PTT control and the ability of direct world-wide IP multicasting vs. that of a telebridge conference call.
 - Improve the flexibility of ARISS event scheduling utilizing the availability of numerous world-wide AMSAT tracking stations.
 - Bring the excitement of Amateur Radio back to the classroom and allow all participants to view what is happening.
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How Did We Get Here?

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- The ISS travels at 16,000 MPH and many times an ISS pass near a the school may not be the best. Contact time may be limited.
 - The tracking equipment required to communicate directly with the ISS is not available to some 50% of schools wishing to participate.
 - Voice/IP technology is now available to connect a PC in a classroom to remote satellite tracking stations from just about anywhere in the world.



Available Options



- There are over 130,000 registered users of Amateur Radio Voice/IP software in some 150 countries, many of which are AMSAT tracking stations or Universities.
 - During an ARISS event, a ham operator could simply walk into the classroom with a laptop computer and via the Internet, connect to the remote AMSAT ground station designated to contact the ISS.
 - That computer could also be running tracking software and provide an output to a video projector for viewing by a larger audience.
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AMSAT

Ground Station Configuration



Tracking Antenna (Automated)



VHF Satellite Radio



Vo/IP PC

To Internet

School Configuration



Ham Operator

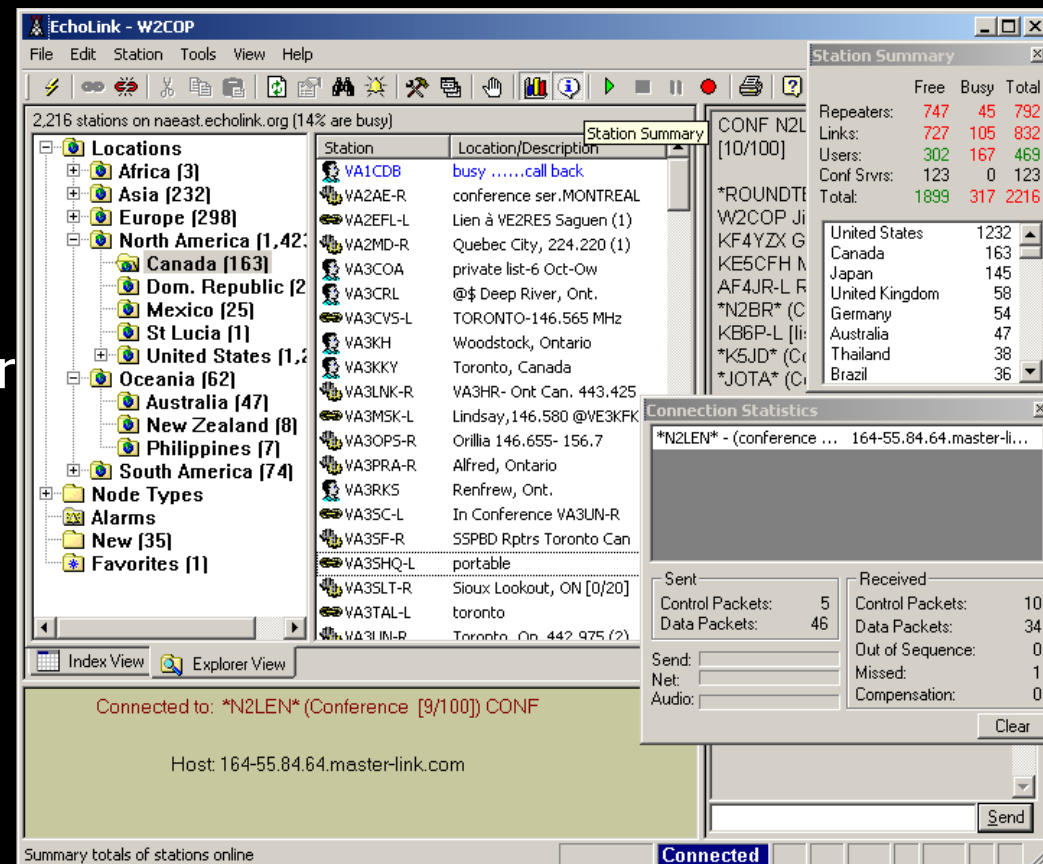
To Internet

Echolink Software

Echolink is Voice/IP software that runs in either one of two modes:

- Single User mode on a PC; or
- Sysop mode where the PC is interfaced to a radio.

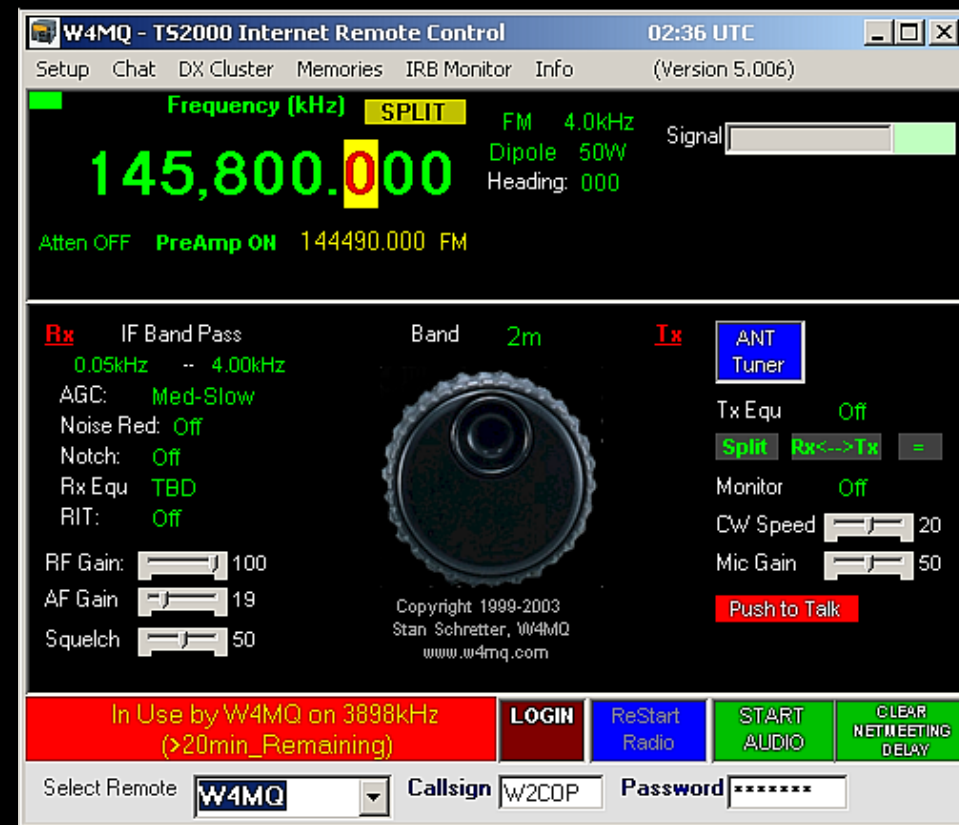
Either mode can be connected to a Conference channel, allowing 100s of users to be connected at once!



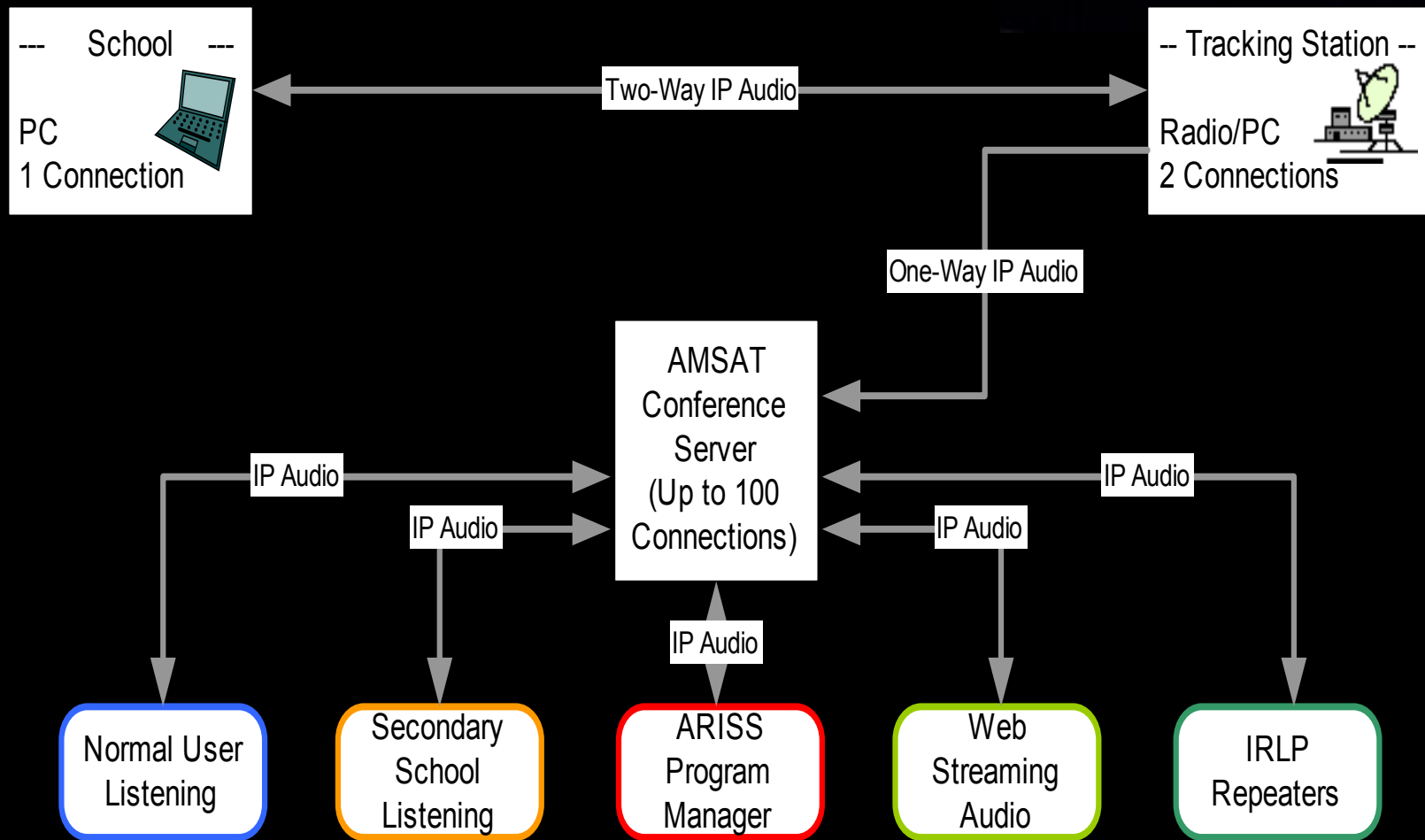
Internet Remote Base Radio/IP Software



- IRB is true Radio/IP software. It is similar to Echolink, however:
- It offers full remote control of the satellite radio at the other end.
- Brings the true radio experience back into the classroom
- Also interfaces to Echolink for multiple Conferences Users



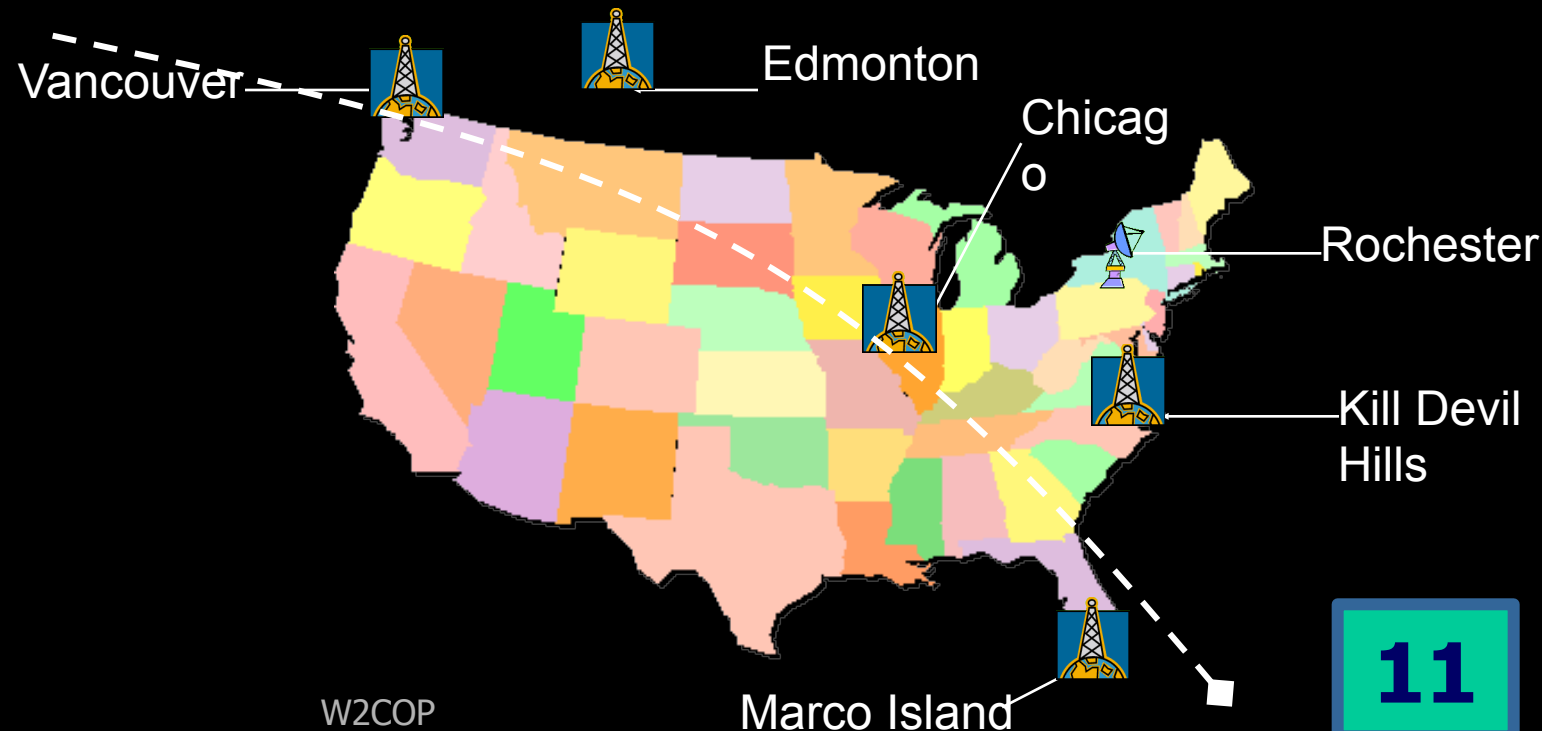
Voice/IP Configuration

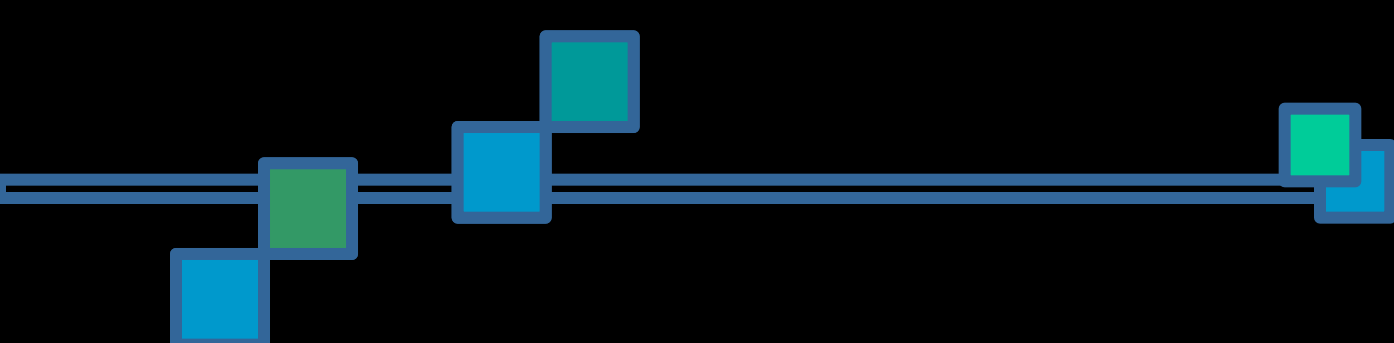


Voice/IP ARISS Concept Tested

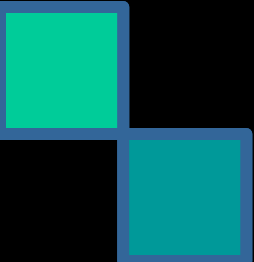


- The Sept. 2003 ISS contact from a Rochester, NY school consisted of the ground station at the school and 5 existing North America EchoLink base stations with just omni antennas, tuned to 145.8 MHz. All the stations connected to an Echolink Conference Channel and we tracked ISS audio for over 25 minutes from coast-to-coast, in digital quality.





Recommendations

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- Use existing Telebridge Conference Stations. They have ARISS experience and may only need to install the free software and a simple audio interface between their satellite radio and PC.
 - Setup at the school is now much easier, consisting of only an audio test over the PC to the tracking station ahead of time. PC's also provide the flexibility of line-in and line-out jacks for easy interface to a local amplifier and stage mike for the students.
 - Wireless PC Internet cards are a viable alternative and work extremely well for Voice/IP applications. Verizon Wireless has agreed to sponsor our ARISS initiatives.



Benefits

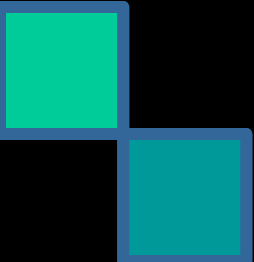
- Audio can be easily ported to Conference Servers on Echolink and IRLP. IRLP also has a public stream to the Internet. Parents of participating students no longer need to find a shortwave radio to listen to their child talk with an astronaut, they only need to bring up a web page. This can also be monitored by other schools and stations planning to participate in future ARISS contacts.
- ARISS mentors can monitor the school contacts in different parts of the world right from their PC's. They can critique contacts and formulate strategies to improve the program as needed.
- Programs such as Echolink have a built-in digital voice recorder to archive the contact.
- A digital Voice/IP connection over the Internet is superior in quality to an analog tele-bridge conference phone call.

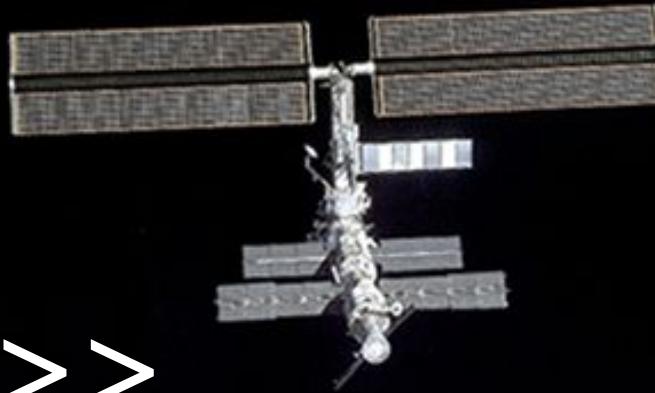
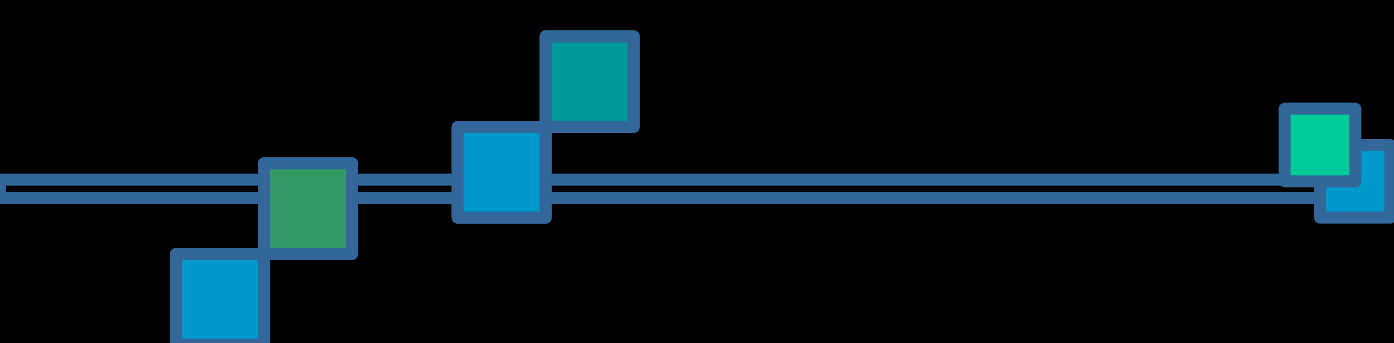




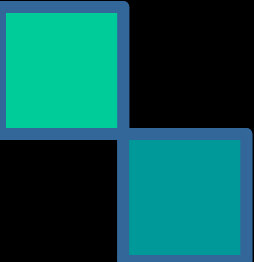
Future Goals



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- Amateur Radio Voice/IP software is used worldwide and is free. Satellite Voice/IP gateways can easily be established on many continents, not only for ARISS but for all Amateur Radio Satellite communications.
 - More schools will have the opportunity to participate directly in the ARISS program and this concept will increase the visibility of Amateur Radio in the classroom. The availability of additional ground stations in other countries could also eliminate the barriers of 3rd party restricted communications where they exist.
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THANK YOU > > > > > > >



A LIVE DEMO will take place in the lobby at 3:30 PM following the last presentation, using both Echolink and Internet Remote Base on a laptop with a Verizon Wireless Internet Card.



73's/Jim
W2COP